Remarks:

Reconsideration of the application is requested.

Claims 4-7 remain in the application. Claim 4 has been amended. Claims 1-3 had been previously cancelled and have now been included in the listing of all claims pertaining to the application.

In item 3 on page 2 of the Office action, claims 4-7 have been rejected as being obvious over Arbach et al. (5,021,129) in combination with Angelopoulos et al. (6,136,513), Bickford et al. (5,800,858) and further in combination with Schupp et al. (4,596,759), Beyne et al. (6,362,484), or Conrad et al. (5,998,237) under 35 U.S.C. § 103.

Claim 4 has been amended to better define the invention. Support for the limitation, "activating all of the first insulating layer by treatment with an activator" can be found by referring to the specification at page 7, lines 6-13. Please note that the first insulating layer is activated before the second insulating layer is applied and therefore all of the first insulating layer will be activated. Reference can also be made to example 1 on page 11 and examples 5 and 7 on pages 12-14. Support for the limitation, "then seeding and metallizing regions of the first insulating layer that are exposed by the patterning step" can be found by referring to

the specification at page 10, lines 23-25. Further support can be found by referring to page 13, lines 13-23 (note the use of "bare positions" on line 14 of page 13).

Arbach et al. does not pertain to a photolithographic method, and if one were to refer to this document, one would not obtain any information with respect to applying and patterning a second insulation layer made of a photosensitive material. Arbach et al. is completely silent with regard to photolithographic process steps.

Angelopoulos et al. describe a method for metalizing wherein a first dielectric layer (first insulation layer) (14) is applied on a substrate (12). This first dielectric layer is activated and a polymeric auxiliary layer (16) is applied thereon afterwards. A seed layer (18) is applied over the entire surface on this polymeric auxiliary layer. Subsequently, this seed layer is structured, i.e. a photo lacquer is applied, and the photo lacquer is exposed and removed in those areas where the lines are embodied. Subsequently, the photo lacquer must be removed (stripped). Finally, the lines are then embodied by a metalization and portions of the seed layer that cover the entire surface are removed in areas where no lines have been embodied, in order to avoid a short-circuit.

Contrary thereto, claim 1 specifies that a first insulation layer is applied on a substrate, and then the entire first insulation layer is activated. A second insulation layer is applied on the first insulation layer which has been activated by an activator. This second insulation layer consists of a photo-sensitive material. Subsequently, this second photo-sensitive insulation layer is structured, whereby areas of the activated first insulation layer are exposed. The exposed areas of the first insulation layer are subsequently seeded and metalized.

Using a second insulation layer, which is structured after being applied on the activated first insulation layer, is neither disclosed nor suggested in Angelopoulos et al.

According to Angelopoulos et al. the seed layer is seeded, which is embodied on the polymeric auxiliary layer (second insulation layer), but not the polymeric auxiliary layer.

The germination of exposed areas of the first insulation layer, however, have advantages as compared to the method taught in Angelopoulos et al..

According to the invention, no photo lacquer is applied for the metalization of an insulator, which must subsequently be removed. The second insulation layer (photo-sensitive) remains

in those areas where a metalization is formed. One process step, the stripping, can thus be left out, which lowers the costs of the process.

Such a process is not even hinted to in Angelopoulos et al.. According to Angelopoulos et al. the entire polymeric auxiliary layer and not the exposed areas of the activated first insulation layer are seeded and a photo layer is necessary which must be removed after the process. This has the disadvantages described in the introductory specification, in particular that a particle formation is caused due to the lacquer stripping which leads to a particle formation which leads to a yield decrease. This particle formation is caused by the remainders of the stripped photo-lacquer that can remain on the substrate.

Furthermore, Angelopoulos et al. neither discloses nor suggests that partial areas of the activated first insulator layer are germinated. Angelopoulos et al. uses an additional polymeric auxiliary layer which is completely seeded. The additionally applied polymeric auxiliary layer is not applied so that this polymeric auxiliary layer is completely an evenly seeded.

Furthermore, the claimed method also has the advantage that fewer germinating means are necessary because only those areas

are seeded which are to be metalized. Furthermore, the process step of removing the seed layer in the non-metalized area is not necessary, which, according to the method of Angelopoulos et al. is necessary in order to prevent short-circuits between the conductor tracks because, according to Angelopoulos et al., the entire polymeric auxiliary layer is seeded.

An additional photo-lithographic mask is necessary for this removal of the seed layer, which is complementary to the mask, by means of which the photo lacquer has been exposed for the structuring of the seed layer. This additional mask can also be done without in the claimed method.

However, should the Examiner be of the opinion that it would also be possible to embody the photo-lithographic step such that the definition of the area of the metalization were carried out in that the areas of the seed layer which are not to be metalized are removed, it must be noted that, first, there is no indication in Angelopoulos et al. (here, the metalization is always carried out in that the photo lacquer is removed at those locations where a metalization is to take place later) and, second, that this method would have the disadvantage that a metalization carried out in such a manner would lead to a problem, that small amounts of metal would deposit in those areas which are not to be metalized and there

either create short-circuits or must be removed in an extensive process.

According to the claimed method, both disadvantages do not exist because in the claimed method, the seed layer is only formed in those areas which are subsequently metalized.

Furthermore, according to Angelopoulos et al., the polymeric auxiliary layer must remain below the embodied conductor tracks, this increases the layer thickness of the entire configuration.

Furthermore, according to Angelopoulos et al., the embodied metalization, i.e. the conductor track, is disposed on the substrate in a raised manner, while according to the invention, the metalization is embodied on the first insulation layer, i.e. sunk in the second insulation layer. A partial insulation of the conductor tracks thus takes place simultaneously with the embodiment of the metalization.

Even if one of ordinary skill in the art were to use Arbach et al., even though the reference does not pertain to a photo-lithographic method, he would not obtain any information that a second applied insulation layer, which is subsequently structured, is embodied of photo-sensitive material. Arbach et

al. does not contain anything regarding photo-lithographic process steps.

Contrary to the opinion presented in the Office action, it is not obvious for one of ordinary skill in the art to change Angelopoulos et al. so as to structure the second insulation layer prior to seeding. According to Angelopoulos et al., this second insulation layer is applied in order to carry out a complete even seeding on the second insulation layer. One of ordinary skill in the art thus does not have any reason to structure the second insulation layer in such a manner so as to seed the first insulation layer, as defined in claim 1, because this contradicts the purpose of the second insulation layer.

However, should the Examiner have meant that the second insulation layer is structured so that the areas that are not to be metalized are removed, the above-mentioned advantages of the partial metalization of these areas arise. In particular, the method for seeding disclosed in Angelopoulos et al. is only a dipping of the substrate into a solution. With such a dipping, however, it would not be easy to prevent without additional processing steps that areas are seeded which are not meant to be seeded. Furthermore, the method changed in such a manner still has the disadvantage that these two insulation layers would remain below the conductor plate, even

in the combination based on Angelopoulos et al., which increases the thickness of the metalized substrate and which would lave the conductor tracks in a raised state.

In summary, based on Angelopoulos et al. in combination with Arbach et al., one of ordinary skill in the art does not obtain any information how he should change this method in order to seed the activated first insulation layer.

Consequently, the claimed method is not suggested by a combination of Angelopoulos et al. with Arbach et al..

As compared to Arbach et al., the claimed method has the advantages that it is not limited to the use of materials having a matching redox-potential for the first and second insulation layer. The entire method according to Arbach et al. is based on these different redox potentials because the later activation which according to Arbach et al. is only possible with the reduction by means of electrons and the subsequent seeding is only possible in the desired areas.

Based on Arbach et al. and Angelopoulos et al., one of ordinary skill in the art does not obtain any teaching or suggestion to activate the first insulation layer before applying the second insulation layer.

On the one hand, the activation of the first insulation layer in Angelopoulos et al. serves for the improved embodiment of the second insulation layer so that a full-surface seeding can be embodied on this second insulation layer. This, however, is not necessary in Arbach et al.. In Arbach et al., the purpose of the activation is an improved embodiment of the seeding directly on the activated first insulation layer. According to Arbach et al. they completely rely on the different redox potentials of the materials of the two insulation layers. These different redox potentials are completely sufficient in order to carry out such a selective activation and subsequent seeding.

On the other hand, the activation steps of the first insulation layer, contrary to the opinion voiced in the Office action, would not suggest to one of ordinary skill in the art that the activation would reduce the amount of the seeding material because according to Angelopoulos et al., the entire surface of the polymeric auxiliary layer is completely seeded. This, however, means an increase of the required seed material as compared to the seeding in Arbach et al., according to which only the areas that are to be metalized, are seeded.

Arbach et al. and Angelopoulos et al. do not contain any information that an activation of the first insulation layer prior to applying the second insulation layer. The advantage

arises that it is no longer absolutely necessary to use materials for the first and second insulation layer such that the redox potentials of which match each other. In an extreme case, the same material can even be used for the first and the second insulator layer.

Bickford et al. and the newly cited Schupp et al., Beyne et al. and Conrad et al. also disclose a method for metalizing insulation layers, where a first insulation layer is activated, and a second insulation is embodied on the first activated insulation layer. The second insulation is subsequently structured so that partial areas of the first activated insulation layer are freed. The partial areas are subsequently seeded and a metalization is then carried out on the embodied seeding. The claimed invention is neither disclosed nor suggested by a combination of Angelopoulos et al., Arbach et al., Bickford et al., and either Schupp et al., Beyne et al. or Conrad et al.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 4. Claim 4 is, therefore, believed to be patentable over the art and since all of the dependent claims are ultimately dependent on claim 4, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 4-7 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, he is respectfully requested to telephone counsel so that, if possible, patentable language can be worked out.

Petition for extension is herewith made. The extension fee for response within a period of one month pursuant to Section 1.136(a) in the amount of $110.00 in accordance with Section 1.17 is enclosed herewith.

If an extension of time for this paper is required, petition for extension is herewith made.

Please charge any other fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and

Greenberg, P.A., No. 12-1099.

Respectfully submitted,

Mark P. Weichselbaum
Reg. No. 43,248

For Applicants

MPW:cgm

August 20, 2003

Lerner and Greenberg, P.A.
Post Office Box 2480
Hollywood, FL 33022-2480
Tel: (954) 925-1100
Fax: (954) 925-1101